

A Survey of the Aphodiinae, Hybosorinae and Scarabaeinae (Coleoptera: Scarabaeidae) from Small Wet Forests of Coastal New South Wales, Part 3: Buladelah to Taree.

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Abstract

Records of Aphodiinae, Hybosorinae and Scarabaeinae from wet forest types at Buladelah, Wallingat, Kiwarra and Yarratt State Forests and Wingham Brush are listed. Data includes dates of collection, numbers of individuals encountered, vegetation and soil type, groundcover and bait type or collection method used. The occurrence of partial carphophagy is recorded for the genus *Lepanus* and distribution extensions are noted for several species.

Introduction

The first two parts of this study surveyed the wet forests from Nowra to Newcastle (Williams and Williams 1982) and the high altitude and associated escarpment forests from the Barrington Tops to the Comboyne Plateau (Williams and Williams 1983).

Part 3 surveys a variety of forest habitats from Buladelah on the lower north coast of New South Wales to just north of Taree. The dung beetle fauna of this region appears almost unknown as Matthews (1972, 1974, 1976) records only *Cephalodesmus armiger* Westwood and *Diorygopyx asciculifer* Matthews from Wingham and *Amphistomus speculifer* Matthews and *Onthophagus sydneyensis* Blackburn from Buladelah.

The region is rich in wet sclerophyll forest and rainforest types developed along creeks and gullies, frequently with a distinct rainforest understorey developed below emergent eucalypts such as the Flooded-gum, *Eucalyptus grandis* W. Hill ex Maiden. Many of the

drier forest types possess small seasonally dry creeks and shallow run-off gullies dominated by *Melaleuca/Callistemon* communities in association with venturesome or marginal rainforest genera such as *Glochidion*, *Synoum* and *Alphitonia* whilst the larger perennial creeks on farm lowlands are often encompassed by a distinct wet forest community dominated by the tree *Syzygium floribundum* F. Muell. and the large wattle, *Acacia melanoxylon* R. Br. Of particular interest is the Wingham Brush site as this small dry/subtropical rainforest stand (8 hectares) represents almost 10% of the remaining alluvial subtropical rainforest in New South Wales.

In addition to sampling in wet forest communities, some comparative pit-fall trapping and incidental collecting, was undertaken in dry sclerophyll forest at Yarratt State Forest to the north of Taree and Wingham. This data follows that given in Table 1 for wet forest study sites. Yarratt is primarily a lowland dry sclerophyll forest with few wet forest communities to be found in its southern and central sections though creek and gully wet sclerophyll forest and rainforests are common in the north where the forest approaches the Comboyne Plateau. This area however, was not sampled.

Baited pit-fall traps were continued to be used to capture the beetles and, on occasions, a range of bait types were simultaneously offered. A map of the study sites is given in Fig. 1 and descriptions of site vegetation, soil type and groundcover are given briefly in Table 1. A list of species encountered is given in

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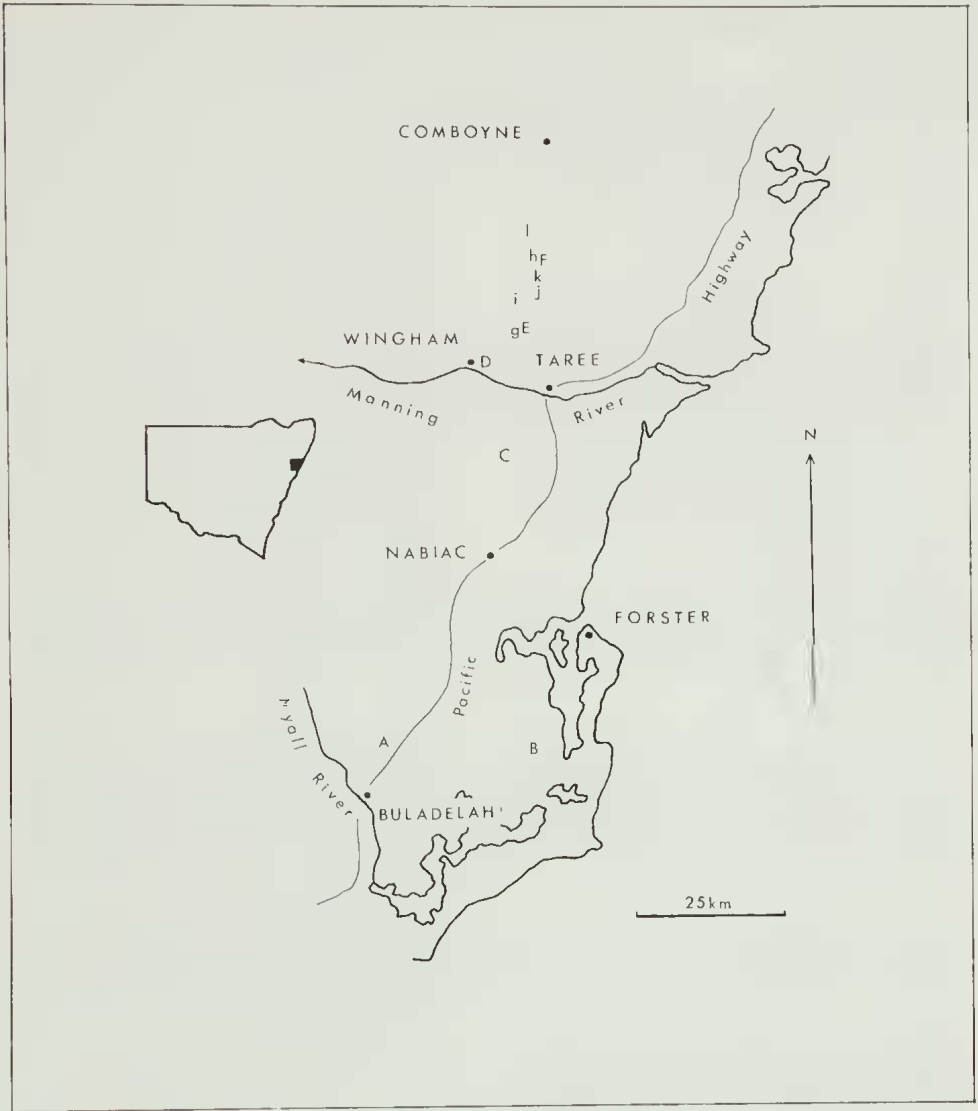


Figure 1. Map of study sites.

- A. Buladelah State Forest.
- B. Wallingat State Forest.
- C. Kiwarrak State Forest.

D. Wingham Brush.

E-F. Yarratt State Forest (wet forest types).

G-L. Yarratt State Forest (dry sclerophyll types).

Table 2. A more precise location of study sites in Yarratt State Forest is given in Fig. 2 and the distribution of rainforest, wet sclerophyll and wet sclerophyll forest with a significant rainforest understorey is illustrated for that state forest.

Discussion

The small, creek restricted, rainforest/wet sclerophyll forest communities at Buladelah (A), Wallingat (B) and Yarratt State Forest (F) possess a relatively rich and diverse, typically "wet forest", dung beetle fauna. Sampl-

Table 1. List of study sites and species taken at each.

(Dates of collection are followed by figures in parenthesis indicating the number of specimens taken.)

A. Buladelah State Forest; adjoining southern section of the O'Sullivan's Gap Flora Reserve. Wet sclerophyll forest with well developed rainforest understorey along creek. Grey clay-loam soil with light leaf litter and fern groundcover.

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| <i>Liparochrus fossulatus</i> Westwood. 1.x. 1977, (1); 13.xi. 1977, (2); 1.xii. 1979, (4), at faeces. | <i>Onthophagus arrilla</i> Matthews. 1.iv. 1977, (3); 15.x. 1977, (3); 13.xi. 1977, (6); 18. ix. 1978, (1); 1.xii. 1979, (2), at faeces. |
| <i>Amphistomus speculifer</i> Matthews. 13.xi. 1977, (2); 1.xii. 1979, (5), at faeces. | <i>Onthophagus bornemisszai</i> Matthews. 13.xi. 1977, (1); 1.xii. 1979, (3), at faeces. |
| <i>Aulacopris maximus</i> Matthews. 13.xi. 1977, (1), at faeces. | <i>Onthophagus kiambram</i> Storey. 18.ix. 1978, (1); 20.iv. 1979, (1), at faeces. |
| <i>Cephalodesmus armiger</i> Westwood. 1.iv. 1977, (4); 13.xi. 1977, (1); 20.iv. 1979, (1); 1.xii. 1979, (2), at faeces. | <i>Onthophagus leanus</i> Goidanich. 6.i. 1978, (1), at faeces. |
| <i>Diorygopyx asciculifer</i> Matthews. 1.iv. 1977, (8); 16.x. 1977, (7); 21.ix. 1979, (4); 1.xii. 1979, (4), at faeces. | <i>Onthophagus neostenocerus</i> Goidanich. 1.iv. 1977, (1); 16.x. 1977, (3); 13.xi. 1977, (1); 6.i. 1978, (4), at faeces. |
| <i>Lepanus bidentatus</i> (Wilson). 13.xi. 1977, (1); 11.xii. 1980, (1), at faeces. | <i>Onthophagus</i> sp. near <i>nurubuan</i> Matthews. 6.i. 1978, (6), at faeces. |
| <i>Monoplistes leai</i> Paulian. 13.xi. 1977, (5); 6.i. 1978 (1), at faeces and UV light. | <i>Onthophagus sydneyensis</i> Blackburn. 1.iv. 1977, (3); 16.x. 1977, (2); 1.xii. 1977, (2); 18.ix. 1978, (1); 1.xii. 1979, (2); 11.xii. 1980, (2), at faeces. |
| <i>Notopedia sylvestris</i> Matthews. 28.v. 1978, (1), at faeces. | |

B. Wallingat State Forest; western end of Yarric Road adjoining the northern section of the Sugar Creek Flora Reserve. Depauperate rainforest — wet sclerophyll forest complex, creek restricted, and developed below *Acacia* and *Eucalyptus* emergents. Grey-brown sandy loam with medium density leaf litter coverage.

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| <i>Cephalodesmus armiger</i> Westwood. 30.ix. 1981, (1), at faeces. | <i>Onthophagus kiambram</i> Storey? 30.ix. 1981, (2), at faeces and chicken bones. |
| <i>Lepanus bidentatus</i> (Wilson)? 27.x. 1981, (1), at faeces. | <i>Onthophagus pugnax</i> Harold. 30.ix. 1981, (1), at chicken bones. |
| <i>Monoplistes leai</i> Paulian. 27.x. 1981, (1), at faeces. | <i>Onthophagus sydneyensis</i> Blackburn. 30.ix. 1981, (2), at faeces. |
| <i>Onthophagus arrilla</i> Matthews. 30.ix. 1981, (8); 27.x. 1981, (1), at faeces and chicken bones. | |

C. Kiwarrak State Forest; approximately 1 km north of Breakneck Lookout. Dry type rainforest on steep slope, grey clay-loam soil with medium density leaf litter and herb coverage of forest floor.

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| <i>Liparochrus silphoides</i> Harold. 13.x. 1981, (2), at applecores. | <i>Lepanus bidentatus</i> (Wilson)? 13.x. 1981, (6); 17.ii. 1982, (3), at faeces and applecores. |
| <i>Diorygopyx asciculifer</i> Matthews. 13.x. 1981, (4); 17.ii. 1982, (5), at faeces. | <i>Onthophagus pugnax</i> Harold. 13.x. 1981, (14), at faeces. |
| <i>Lepanus australis</i> Matthews. 13.x. 1981, (3); 17.ii. 1982, (3), at faeces and applecores. | <i>Onthophagus sydneyensis</i> Blackburn. 13.x. 1981, (5); 17.ii. 1982, (2), at faeces and marsupial droppings. |

D. "Wingham Brush"; Wingham. Remnant example (approx. 8 hectares) of alluvial rain-forest developed on the Manning River flood plain. Sandy loam soil with heavy infestation of forest floor by the introduced Wandering Jew (*Tradescantia*).

Liparochnus silphoides Harold. 10.ii. 1980, (1); 12.x. 1981, (3), at faeces.

Cephalodesmius armiger Westwood. 10.ii. 1980, (6); 12.x. 1981, (10), at faeces.

Diorygopyx asciculifer Matthews. 10.ii. 1980 (3); 12.x. 1981, (18), at faeces.

Onthophagus neostenocerus Goidanich. 10.ii. 1980, (1); 12.x. 1981, (1), at faeces.

Onthophagus pugnax Harold. 10.ii. 1980, (1), at faeces.

E. Yarratt State Forest, N.E. of Wingham. (Southern forest section, approximately 0.5 km north of junction of Main and Old Port Macquarie Roads). Seasonally dry, creek restricted depauperate wet sclerophyll assemblage established under a dry sclerophyll forest canopy. Medium to heavy leaf litter cover, brown loam soil.

Monoplistes leai Paulian. 7.x. 1981, (3), at faeces.

Onthophagus sydneyensis Blackburn. 7.x. 1981, (3), at faeces.

F. Yarratt State Forest, N.E. of Wingham. (Central forest section, junction of Graded Ridge and Eastern Boundary Roads). Creek restricted rainforest/wet sclerophyll forest assemblage; medium leaf litter cover on loam soil.

Lepanus australis Matthews. 8.x. 1981, (3), at faeces and chicken bones.

Monoplistes leai Paulian. 10.ii. 1981, (2); 8.x. 1981, (1), at faeces.

Onthophagus kiambram Storey. 8.x. 1981, (1), at faeces.

Onthophagus neostenocerus Goidanich. 23.iv. 1981, (1), at faeces.

Onthophagus pugnax Harold. 23.iv. 1981, (1), at faeces.

Onthophagus sydneyensis Blackburn. 10.ii. 1981, (1), at faeces.

G. Yarratt State Forest, N.E. of Wingham (Southern forest section immediately adjoining Site E.). *Casuarina* dominated dry sclerophyll forest. Medium density leaf litter cover (prior to August 1981), brown loam soil.

Onthophagus dandalu Matthews? 10.ii. 1981, (1), at faeces.

Onthophagus dunningi Harold. 23.iv. 1981, (2), at faeces.

Onthophagus leanus Goidanich. 10.ii. 1981, (1), at faeces.

Onthophagus macrocephalus Kirby. 10.ii. 1981, (17); 21.iv. 1981, (1), at faeces.

Onthophagus tweedensis Blackburn. 10.ii. 1981, (3); 23.iv. 1981, (1); 7.x. 1981, (1), at faeces.

H. Yarratt State Forest, N.E. of Wingham. (Central forest section immediately adjoining Site F.) Dry sclerophyll forest, but with adventitious wetter forest species forming a low percentage of the understorey element. Medium density leaf litter cover (prior to August 1981); brown loam soil.

Monoplistes leai Paulian. 10.ii. 1981, (5); 7.x. 1981, (1), at faeces.

Notopedia sylvestris Matthews? 10.ii. 1981, (1), at faeces.

Onthophagus auritus Erichson. 8.x. 1981, (1), at faeces.

Onthophagus leanus Goidanich. 8.x. 1981, at faeces.

I-L. Yarrat State forest, N.E. of Wingham. (Miscellaneous sites from the upper southern to the lower northern sections of the forest.) Tall to low canopy dry sclerophyll forest.

- Aphodius lividus* Oliv. 23.xii. 1981, (1), at u/v light.
- Ataenius tweedensis* Blackburn, 23.xii. 1981, (3); 20.i. 1982, (2), at u/v light.
- Euparia* sp.? 5.ii. 1981, (1), under horse manure.
- Proctophanes sculptus* Hope. 24.iv. 1981, (3), in horse manure.
- Onthophagus atrox* Harold. 28.xii. 1981, (6); 20.i. 1982, (2), at u/v light.
- Onthophagus chepara* Matthews. 11.i. 1982, (1), at u/v light.

- Onthophagus depressus* Harold. 23.xii. 1981, (1), at u/v light.
- Onthophagus gazella* (Fab.) 23.xii. 1981, (1); 20.i. 1982, (3), at u/v light.
- Onthophagus kokereka* Matthews. 5.ii. 1981, (2), in wallaby droppings.
- Onthophagus macrocephalus* Kirby. 10.iv. 1981, (1), at faeces.
- Onthophagus* sp. near *nurubuan* Matthews. 5.ii. 1981, (2), under wallaby droppings.

Table 2. Systematic summary of species encountered. (Letters indicate sites, lower case letters indicate dry sclerophyll forest sites. Where indicated, specimens lodge in Australia National Insect Collection, Canberra).



Figure 2. Yarrat State Forest (A-B Wet forest study sites; g-l Dry sclerophyll forest study sites; numbers indicate elevation in metres; stippled areas indicate distribution of rainforest and wet sclerophyll forest communities, this does not include dry sclerophyll types containing adventitious "rainforest" spp. as a low proportion of the understorey.)

- Family Scarabaeidae.
- Subfamily aphodiinae.
- Aphodius lividus* Oliv. j.
- Ataenius tweedensis* Blackburn. j.
- Euparia* sp.? k.
- Proctophanes sculptus* Hope. k. Specimen in A.N.I.C.
- Subfamily Hybosorinae.
- Liparoehrus fossulatus* Westwood. A. Specimens in A.N.I.C.
- Liparoehrus silphoides* Harold. C, D. Specimen in A.N.I.C.
- Subfamily Scarabaeinae.
- Tribe Onthophagini.
- Onthophagus arrilla* Matthews. A. Specimens in A.N.I.C.
- Onthophagus atrox* Harold, j,l. Specimens in A.N.I.C.
- Onthophagus auritus* Erichson. h.
- Onthophagus bornemisszai* Matthews. A. Specimen in A.N.I.C.
- Onthophagus chepara* Matthews. l.
- Onthophagus dandahu* Matthews? g.
- Onthophagus depressus* Harold. k.
- Onthophagus gazella* (Fab.). j,k,l. Specimens in A.N.I.C.
- Onthophagus kiambram* Storey. A,F. Specimen in A.N.I.C.
- Onthophagus kiambram* Storey? B. Specimen in A.N.I.C.
- Onthophagus kokereka* Matthews. i.
- Onthophagus macrocephalus* Kirby. g,l. Specimens in A.N.I.C.
- Onthophagus neostenocerus* Goidanich. A,D,F. Specimen in A.N.I.C.
- Onthophagus* sp. near *nurubuan* Matthews. (2 spp?) A,i. Specimens in A.N.I.C.

Onthophagus leanus Goidanich. A,g,h.
Specimen in A.N.I.C.
Onthophagus pugnax Harold. B,C,F.
Specimen in A.N.I.C.
Onthophagus sydneyensis Blackburn. A,B,C,E,F. Specimens in A.N.I.C.
onthophagus tweedensis Blackburn. g.
Specimen in A.N.I.C.
Tribe Scarabaeini.
Amplustomus speculifer Matthews. A.
Aulacopris maximus Matthews. A.
Cephalodesmus armiger Westwood. A,B,D.
Specimens in A.N.I.C.

Diorygopyx asciculifer Matthews. A,C,D.
Specimens in A.N.I.C.
Lepanus australis Matthews. C,F. Specimen in A.N.I.C.
Lepanus bidentatus (Wilson). A. Specimen in A.N.I.C.
Lepanus bidentatus (Wilson) ? B,C.
Specimens in A.N.I.C.
Monoplistes leai Paulian. A,B,E,F,h.
Specimens in A.N.I.C.
Tribe Coprini.
Notopedia sylvestris Matthews. A.
Notopedia sylvestris Matthews ? h.

ing in Yarratt State Forest (compare site F with sites g-l) indicated that the depauperate wet forest community there possesses a distinct dung beetle fauna to surrounding dry sclerophyll forest though one species, *Monoplistes leai* Paulian, entered the adjoining dry/wet forest interface. The species is also known to enter pasture (Allsopp 1975). The marginal, creek restricted, wet

forest community (site E) at the southern end of Yarratt State Forest possessed a much reduced fauna composed of *Monoplistes leai* and *Onthophagus sydneyensis* Blackburn, both primarily wet forest species that will enter drier vegetation zones.

It is of interest to note that sampling at site E, on the 10 February and the 23 April 1981, prior to a control burn of



Fig. 3. Wingham Brush, showing proximity of the rainforest to the township. Arrows indicate the extent of the rainforest remnant. The horizon is formed by the mountains of Kiwarra State Forest to the south.

surrounding dry sclerophyll forest in August of that year, produced no dung beetles though large numbers of the carabid beetle genus *Myxotropomus* were present in the pit traps on both occasions. *Myxotropomus*, however, were absent when dung beetles were taken on the third sampling visit on 7 October 1981.

No beetles were collected in pit traps set at site h (Yarratt S.F.) on the 23 April 1981, nor were dung beetles taken at traps set, during periods of local drought, at Wallingat State Forest in late January 1981 and at Buladelah State Forest in the spring of 1979.

The Buladelah site has proved the most rich in numbers of species of any of the forests we have yet sampled. 15 species are recorded from it and many of these are species representing interesting distribution extensions or species previously poorly known.

As only *Cephalodesmus armiger*, *Diorygopyx asciculifer*, *Amphistomus speculifer* and *Onthophagus sydneyensis* have been previously recorded from the wet forests of this part of our study (Matthews 1972 and 1974) all the remaining species listed constitute new records for the region. Several records, however, are of particular interest; *Monoplistes lei* was previously recorded only from the New South Wales-Queensland border area (Matthews 1974, Ahsopp 1975, 1977) and *Notopedaria sylvestris* Matthews was known from far northeastern New South Wales and southeast Queensland (Matthews 1976). *Onthophagus arrilla* Matthews and *O. kiambram* Storey had been recorded from the New South Wales-Queensland border area and from southeast Queensland respectively (Matthews 1972, Storey 1977) and have more recently been collected from the Barrington Tops and Comboyne region (Williams and Williams 1983). In addition to species collected from wet forest sites, several interesting distribution

records are noted for species from dry sclerophyll forest sites. *Onthophagus atrox* Harold had not been recorded south of Glen Innes and Coll's Harbour, northern New South Wales, and *O. kokereka* Matthews had been recorded from Glen Innes and Woodburn north into Queensland as far as Townsville (Matthews 1972). The occurrence of *Onthophagus tweedensis* Blackburn in *Casuarina* dominated dry forest at site g is a minor extension southward from Kendall, approximately 40 kms to the northeast.

Two Scarabaeini, *Amphistomus primonactus* Matthews and *Aptenocanthon hopsoni* (Carter), that were common in wet forest to the north and west (Williams and Williams *loc. cit.*) at higher elevations, do not appear to extend further eastward and are absent from this study area. *A. hopsoni* is very common in wet forests at Barrington Tops and extends from there in a northeasterly direction to the Comboyne Plateau, where it is found as a significant element of the fauna, but does not penetrate to wet forests of the coastal plain. In this *Aptenocanthon hopsoni* closely mirrors *Lepanus illawarrensis* Matthews from montane localities from the west and south of Sydney. *L. illawarrensis* occurs at Mt Wilson, as a conspicuous element of the rainforest fauna, and extends southwards approximating the coast only along the Wollongong escarpment (Matthews 1974, Williams and Williams 1982).

Aphodiinae were not collected during sampling visits at wet forests in this study part but 4 species, *Aphodius lividus* Oliv., *Ataenius tweedensis* Blackburn, *Euparia*? and *Proctophanes sculptus* Hope, were collected in dry sclerophyll forest at Yarratt State Forest. Paulian (1980) does not record any hybosorines from this region but 2 species of the genus *Liparochrus*, *L. silphoides* Harold and the closely related *L. sculptilis* Westwood, are listed by him

From the Barrington and Tomalla Tops to the west.

Two species of the scarabaeine genus *Lepanus*, *L. australis* Matthews and *L. bidentatus* (Wilson) ?, were collected in applecore baited pit traps at Kiwarrak State Forest. The beetles were present at applecores in greater numbers than at faeces baited traps simultaneously offered. No dung beetles were collected from fresh fish flesh, offered as a third bait choice on the same trapping period. *Lepanus* (as *Panehus*) has previously been recorded as occurring at the fruits of *Pisonia* (Paulian 1934, 1980). Insects are actually trapped by the sticky *Pisonia* seeds (Matthews 1974) so that records from the seeds of *Pisonia* may not necessarily imply carphophagous habits in dung beetles found there.

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